



BISON PRECAST

a Forterra brand

TECHNICAL GUIDANCE NOTE

Balconies - 20 November 2017

BALCONY CONNECTION TO PRECAST FLOORING

1.0 Introduction

A balcony can be formed and fixed in place by many different means. This document aims to discuss the different options which can be used and provide typical details where appropriate.

The main way of supporting a balcony is to cantilever it out from the main floor slab. If this balcony is to be exposed then it will need a thermal break to isolate it from the main floor. However, if the balcony is essentially forming a bay window then a thermal break is not required as the floor will be insulated underneath and be part of the room on the top surface.

The other way of forming a balcony is to support a simple slab on external support walls or a steel frame. The slab may be supported on two opposite edges or fully supported and a thermal break may be required if the balcony is required to be tied back to the main floor for restraint purposes.

A thermal break is formed by placing insulating material around the reinforcing bars that connect the balcony to the main floor slab. These can be proprietary systems manufactured by a range of manufacturers or formed in-situ.

Depending on the type of material the balcony is made from there are different solutions for fixing it in place.

2.1 Steel balcony bolted end on to a hollowcore slab using L shape bracket

The benefit of a steel balcony is that it is lightweight and can easily be modified to suit site requirements. The steel frame is bolted to the thermal break which is bolted to an L shape bracket which fits over the floor slab and can either be bolted through the floor slab with plate washers underneath or bolted into the floor slab with resin fixings. If the balcony is to be fixed to the end of the hollowcore slab then a 10mm diameter or 12mm diameter reinforcing bar can be placed in each of the middle six cores and concreted in place within the factory. The length of the reinforcing bar will vary depending on the tie forces. For 150mm deep units the other option is to use the P150C slab which is a solid slab that has prestressing tendons in the bottom and in the top to resist the tie forces.

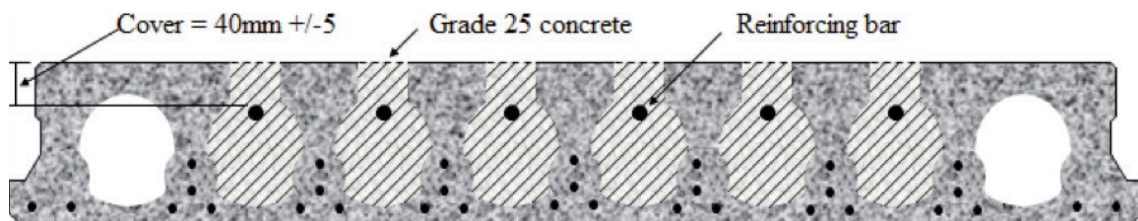


Figure 1 - Reinforcement within the top of the middle cores.



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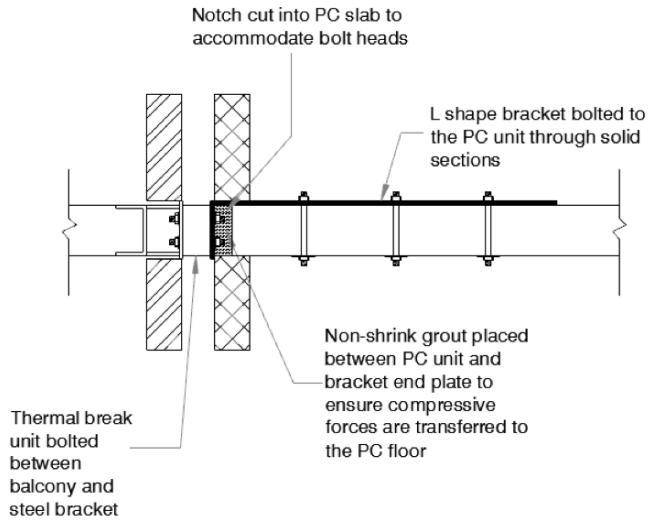
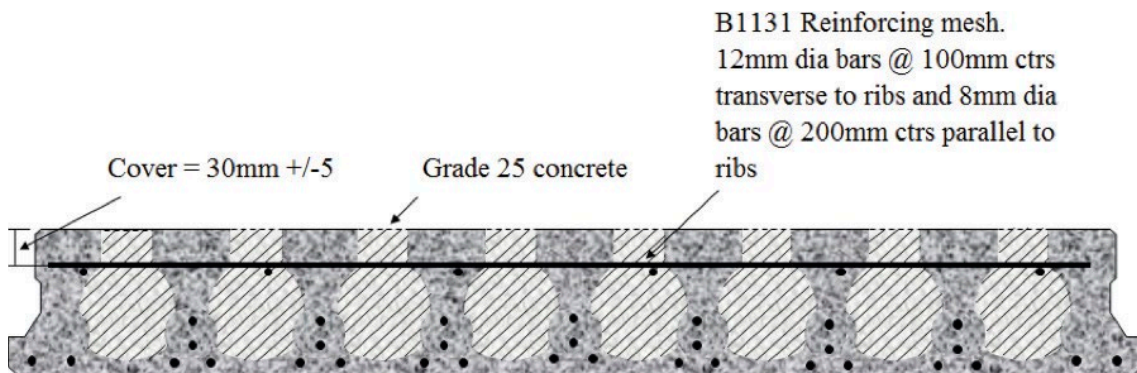


Figure 2 - Section through hollowcore slab with L shape bracket fixed through the floor. Note a notch is shown on the end of the slab, this may be omitted if captive bolts are used on the thermal break. Reinforcement omitted for clarity.

2.2 Steel balcony bolted to the side of a hollowcore slab using L shape bracket

If the balcony is to be fixed to the side of the hollowcore slab using the L shape bracket as above then reinforcing mesh, B785 or B1132 is inserted into the top of the slab to resist the tie forces.



The slab is made solid and mesh forced in to the concrete.

Figure 3 - Placement of mesh reinforcement within hollowcore slab

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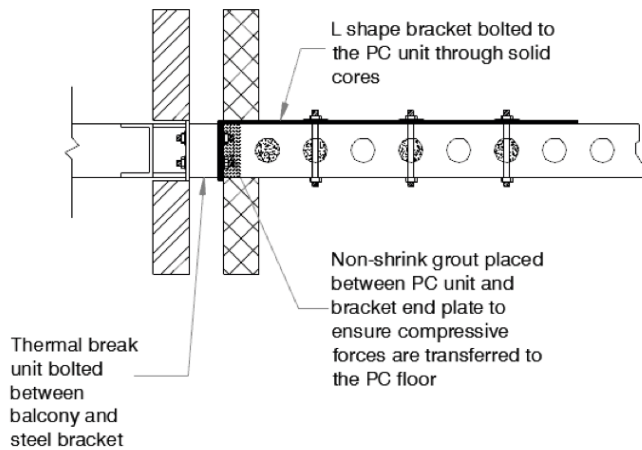


Figure 4 - Section through hollowcore slab with L shape bracket fixed through the floor. Note a notch is shown on the end of the slab, this may be omitted if captive bolts are used on the thermal break. Reinforcement omitted for clarity.

2.3 Steel balcony bolted to post fixed cast-in inserts to a hollowcore slab

The alternative to the L shape bracket is to form a trench within the hollowcore slab by essentially collapsing two cores and one rib with a notch formed at the bearing end to receive the thermal break in addition to 16mm diameter reinforcing bars being inserted at the end of the trench. This detail can only be achieved with hollowcore units manufactured using strand as the rib which is collapsed can not contain any prestressing wires which would be exposed. The subsequent works to install the insert is then undertaken on site.



Figure 5 - Hollowcore slab with trough formed to accept cast-in insert



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2.4 Steel balcony bolted to a RC slab using L shape bracket

When using an L shape bracket the bolts will fit over the floor slab and can either be bolted through the floor slab with plate washers underneath or bolted into the floor slab with resin fixings. As the slab is cast with top and bottom steel there is usually no requirement to add additional steel reinforcement.



Figure 6 – Section through RC slab with L shape bracket fixed through the floor.

2.5 Steel balcony bolted to a RC slab with cast inserts

Should cast in inserts be required these are bolted to the formwork and cast in the factory. As the slab is cast with top and bottom steel there is usually no requirement to add additional steel reinforcement.



Figure 7 – RC landing slab with 4No. cast in thermal breaks.



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Figure 8 – Close up of cast in thermal breaks.

2.6 Concrete balcony cast with integral backspan slab

A concrete balcony can be formed by casting it with an integral backspan slab which can either span between the support walls or be supported on steel trimmer beams which are supported of the main floor units. Ancon type connectors with designs to suit loadings and size are our standard detail. Double layer reinforcement in the unit with main reinforcement in the bottom of the backspan spanning left to right and main reinforcement in the top of the balcony slab spanning front to back with 25mm cover to backspan and 40mm cover to balcony. A steel trimmer to support the backspan may be incorporated into the overall solution.



Figure 9 – Plan view of balcony slab cast with integral backspan slab.



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2.7 Concrete balcony with cast in ties

Simple balcony slabs can be cast that are supported independently of the main floor slab and can be provided with cast in bars to tie the slab back to the main floor if required.



Figure 10 – Simple RC slab with cast in bars for tying back to the main floor slab.